DELAWARE GEOGRAPHIC DATA COMMITTEE

Facilitating the sharing and coordinated use of spatially referenced data in Delaware

DRAFT Meeting Summary
Quarterly DGDC/SMAC Meeting
9:00 a.m., February 6, 2003
Delaware Dept. of Agriculture
Dover, DE

Attendance List:

Mike Mahaffie	State Planning Coord.
Sandy Schenck	DGS
Paul Sample	Legislative Council
Pete Gerardi	Facilities Mgmt.
Dick Sacher	UD/RDMS
Tina Callahan	UD/RDMS
John Callahan	UD/RDMS
Vern Svatos	UD/WRA
Nicole Minni	UD/WRA
Jarrod Doucette	UD/WRA
Lillian Wang	DGS
Glenn Gladders	DNREC
David Carter	DNREC/Coastal Pgm.
Rico Santiago	DNREC/Coastal Pgm.
Miriam Pomilio	DNREC/State Parks
Dennis Murphy	DNREC
Tripp Fischer	DNREC
Peter Owosu-Donkor	Dover/Kent MPO
Roger Barlow	USGS
Betzaida reys	USGS
Mark Nardi	USGS
Dan Blevins	WILMAPCO
David Beattie	City of Wilmington
Chad Lauderbaugh	DelDOT
Mark Eastburn	DelDOT
George Kent	DelDOT
George Yocher	Div. of Public Health
Lyn Anderson	Department of Labor
Don Evans	US EPA/Region III
Doyle Tiller	Facilities Management
Brad Ebaugh	Del. Electric Coop
Ken McVicker	National Guard
Kevin Neilson	Public Service Comm.
Anne Jeffers	US Census Bureau
Vicki Lewis	US Census Bureau
Matt Zimolzak	US Census Bureau
Jason Miller	Kent County
Marjorie Duranko	Kent County
Joseph Joachimowski	Davis, Bowen & Freidel
Tim Westbrook	New Castle County
Patrick W. Susi	New Castle County

Welcome and Introductions

Mike Mahaffie began the meeting at 9:15 a.m. The start was delayed to allow more time for people make their way past a traffic accident on Route 13, just north of the meeting site. Mike began with welcome and introductions and asked each person present to introduce themselves to the group.

Information Updates

OrthoImagery Project
Mike Mahaffie reported that he had received the first shipment of data from the contractor, EarthData International. The first delivery was 22 CDs and covered only the southeast corner of the State. There will be around 1970 ortho tiles in the full data set and Mike expects there to be some 500 CDs worth of data by the end of the project.

There will be issues around distribution of the data.

National Hydrography Dataset (NHD)
Sandy Schenck reported that parts of the NHD project that include Delaware (Delaware River/Bay watershed) are "in process" at the USGS Rocky Mountain Mapping Center. Mike Mahaffie noted that DNREC is interested in acquiring the final parts of the state and has sought grant funding for the project.

Space Imaging Offer
Sandy Schenck reported that Space Imaging has sent information (attached) offering a Color-IRS 5-meter mosaic of satellite imagery of Delaware that would cost $2140.90.

Mapping Partnership Office
Sandy Schenck gave an update on the proposal to have USGS staff working at the University of Delaware at the DGS office as a "Mapping Partnership Office." There is a plan and a position and DGS and USGS plan to meet this month on the subject. Roger Barlow noted that there is a problem in that the USGS does not have a permanent budget at this point.

Education Working Group
Lyn Anderson reported on the activities of the Education Working Group. The group will be in charge of the Annual GIS in Education Award program. The group is also organizing a poster contest for students at the annual Conference. Information about the award and the poster (partly attached) contest has been sent out to all schools in Delaware.

DEGIS 2003 Conference Update
John Callahan reported that two day-long GIS workshops have been added to the Conference at no cost. One, sponsored by ESRI, will be on ArcGIS 8.3. The other will be sponsored by ERDAS. They will be held on the days before and after the conference. The Conference Keynote Speaker is Jack Dangermond, CEO of ESRI. The Luncheon Speaker is Bryan Logan, CEO of EarthData International. Governor Minner will be on hand to serve as host. On-line registration is now up and running so please register.

Metadata Clearing House
John Callahan reported that date-searches and additional keyword search capabilities have been added. You can select "Framework" and find just the framework data layers being served on DataMIL.

DataMIL
John Callahan reported that a summary of all data sets has been added to the site. The USGS National Elevation Dataset and National Land Cover Dataset have been added to the site as active layers. Names of Roads have been added to the DelDOT road layer. New Castle Co. parcels have been added to the site. The county parcel database has been hyperlinked to the parcel table. Kent and Sussex parcels will show up on the site very soon. DataMIL has been selected to appear in an ESRI book being published this spring.

2002 Annual Framework Data Report

Mike Mahaffie gave an overview (attached) of the Annual Report on Delaware's Framework that the Delaware Spatial I-Team is preparing for the Governor's Office. Mike went over where the group has come from to develop the Framework and outlined

the various data access tools that have been developed by state agencies, the University of Delaware, and the Counties. He went through all of the Framework layers and gave an update on maintenance and update efforts.

As part of the discussion, there was a concern expressed about the approaches to be used to distribute the new ortho photography. To look into that problem, a new Ortho Distribution Working Group will form. It will include Dave Carter, John Callahan, Dick Sacher, Roger Barlow, Patrick Susi, Mike Mahaffie, and Sandy Schenck. Others who are interested should contact Mike Mahaffie.

Georeferencing Historic Aerial Photography

Dave Carter gave a presentation (attached) on the efforts his staff has undertaken to scan georeference and mosaic aerial photography from 1937 for the whole state of Delaware. The work is partly intended to assist in efforts to create maps of the highest value forest habitat in the state. Areas that are in mature forest in more recent aerial photography that were also in forest in 1937 are likely to be a close to "old-growth" in Delaware, which was essentially clear-cut in its early days.

Dave explained the processes they have used to gather photography, scan it and find the best portions of the old photography for georeferencing. He also went over some of the unique problems of georeferencing such old material.

GIS in the Kent County Public Works Department

Jason Miller of the Kent County Engineering Department gave a presentation (attached) of the use of GIS in his office. His talk focused on the use of GIS in Sanitary Sewer planning using. Jason also noted the increased utility of improved datasets such as the county cadastral data. During discussion, it was suggested that there should be a statewide standard for public-works-related symbology. A Working Group has been suggested and will be explored by Jason and others in that part of the GIS Community.

Re-Aligned TIGER Data

Matt Zimolzak of the US Census Bureau gave a presentation on work to re-align TIGER data files for Delaware to the Delaware road centerline files. Matt gave an overview of the TIGER Enhancement Process. Delaware's TIGER files are done. The 2002 TIGER data for Delaware will be available for use in the next several months. Comments should be forwarded to the Census Bureau.

There was some discussion of how to integrate with that project with the realignment that has been undertaken by the University of Delaware on behalf of New Castle County. That realignment used the county parcel data as a base. Matt Zimolzak explained that the Bureau is constrained to only use linear data such as centerline files to adjust the TIGER database, which is a line-based data set. He noted that the Bureau is not able to align to parcel data.

It was noted, however, that with efforts under way to align the road centerline data more closely with the County parcels data, statewide, it should be the case that future enhancements of the TIGER data set will bring TIGER more closely in line with the parcels.

Wrap Up

The meeting adjourned at approximately noon.

Mahaffie Mike (OBUD)

From: Bellissemo Dan [DBellissemo@spaceimaging.com]
Sent: Monday, February 03, 2003 12:09 PM
To: Mahaffie Mike (OBUD)
Subject: Space Imaging, Delaware 5 m offer

5 meter specs.doc
(29 KB)

Dear Michael,

I would like to introduce myself, my name is Dan Bellissemo, and I am the North East Sales Manager for Space Imaging. A packet of information with a calendar was mailed to you on January 17th, 2003. With this packet, a letter was included which mentioned several of our product lines. One in particular, was the Color IRS 5-meter Mosaic that Space Imaging will have completed by March 31st of this year. This 5-meter IRS state product is an orthorecfified seamless mosaic with natural color.

This product is an affordable source for your entire state, it can be used for LULC, change detection, highway and interstate corridor mapping and studies and 1:50,000 base mapping.

For a limited time your state can purchase this product at $0.4025 per sq km and all the state agencies in Delaware can use the product. This is over half off the retail price.

The price for the state of Delaware would be $2,140.90 plus shipping. I have attached an IRS 5 meter spec sheet, which should answer most of your questions about this product.

I can send a formal quote with this price to you immediately for your approval.

I can be reached by e-mail or at 513-574-0185.

Thank you for your time and consideration,

Dan Bellissemo
North East Sales Manager
Space Imaging LLC
dbellissemo@spaceimaging.com
513-574-0185

5-Meter USA Color

Completion
United States Estimated completion 3/28/03

Product Size and Delivery
Estimated mosaic size: 2,530 GB

Product Specification Summary

1. Summary

	Reference 5m Region, State & County
Extent	Conterminous 48 States
Map Projection	UTM, Geographic & State Plane
Earth Datum	NAD 27, NAD 83 & WGS 84
Resample Method	Cubic Convolution
Format	GeoTIFF (tiled) with TFW Header, and TXT File
Delivery Media	CD-ROM, DVD, HDD & Electronic
Cloud Maximum	Cloud Free
Accuracy	25m CE90; 12m RMSE
Bands	Natural Color (3-2-1) only
Product Tiling	30 minute tiles

2. Details

Description: Color 5-meter image data processed to seamless mosaic of designated U.S. State (excluding Alaska and Hawaii). IRS 1C/1D panchromatic 5-meter imagery is orthorectified and combined with Landsat-7 TM data to produce a 5-meter natural-color image mosaic. The resulting mosaic is divided into 30 x 30-minute tiles for ease of delivery.

Data source: IRS 1C/1D and Landsat-7 satellite imagery. IRS and Landsat imagery is dated between 1999 and 2002. Landsat imagery is selected to minimize seasonal/temporal variations for the colorization process.

Accuracy: 25-meter CE90. Shear is minimized between scenes, resulting in <1 pixel LE 90 across each seam.

Processing: IRS images are orthorectified using USGS National Elevation Data Digital Elevation Model (DEM) and ground control from USGS DRGs, "fuse-blended" with Landsat7, tonally balanced and mosaicked. Mosaic seams will be positioned to reduce visibility. Tonal balance cannot completely compensate for seasonal or other changes in scene content, viewing geometry, or lighting. Seams may be visible, particularly when mosaics are viewed at small scale. Geometric shear will be less than 1 pixel LE90.

Projection:	UTM, Geographic and State Plane projections supported. State Plane zones are identified by their NOS number. State Plane projections are available in NAD27 and NAD83 datum only. UTM and Geographic available in NAD27, NAD83 and WGS84.
Horizontal units:	Meters or U.S. survey feet, Degrees for Geographic.
Datum's:	Choice of WGS84, NAD83, or NAD27.
Bands:	Red, Green, Blue (3,2,1) natural color combination derived from Landsat imagery.
Radiometry:	Colorization and tonal balance processes do not preserve absolute radiometry.
Bits/Pixel:	8 bits per pixel per band.
Sharpening:	The panchromatic images may be sharpened as needed to improve quality of imagery.
Clouds:	Imagery will be cloud-free, with the exception in limited geographic areas where slight haze and "popcorn-like" clouds may be common.
Media:	CD-ROM, DVD, Hard Disk or Electronic Delivery.
Project name:	Customer supplied project name included in metadata and printed on delivery media.
Format:	GeoTIFF with TIFF World File (TFW) Header and ASCII text file.
Tiles:	30-minute by 30-minute tiles unless custom AOI is specified.
File names:	File names will conform to NxxWxxxZ, where xx = 2 digit latitude, xxx = 3 digit longitude, and Z = A for upper left quadrant, B for upper right quadrant, C for lower right quadrant and D for lower left quadrant. Example: N38W104A.
Support Files:	TFW world file, text metadata file, text license file, and shape file showing image tile layout.
Metadata:	Metadata includes file name, projection, datum, ellipsoid, GSD (pixel size), corner coordinates, image size. Metadata is provided in an ASCII text file.
Deliverables:	Media with data, License, Return Policy, Packing List, Packaging.
Compression:	None
File Size:	Approximately 470 MB.
Image Area:	Area of Interest (AOI) is defined by state boundaries. Customer may supply their state boundary for proper alignment to existing datasets.

www.state.de.us/planning/coord/dgdc

NEWS RELEASE
For Immediate Release
Thursday, January 30, 2003

Contact: Mike Mahaffie
Delaware Office of State Planning Coordination
(302) 739-3090 | mike.mahaffie@state.de.us

Delaware Geographic Data Committee to Honor Educators

The Delaware Geographic Data Committee is looking for nominations for the Second Annual Delaware GIS in Education Award to be given to a Delaware teacher as part of the 2003 Delaware GIS Conference on April 29, 2003, at the University of Delaware, in Newark. The award is open to any Delaware K-through-12 teacher.

Each year, the Delaware Geographic Data Committee honors a teacher who has been instrumental in furthering the use of spatial data and Geographic Information Systems (GIS) in education in Delaware. The award will be presented as part of the opening activities of the Conference by Delaware Governor Ruth Ann Minner and Jack Dangermond, the founder of Environmental Systems Research Institute (ESRI) and a leader in the international geospatial information industry.

The Conference will also feature a poster contest for Delaware students entitled "What Geography Means to Me." The posters will be on display at the Conference and attendees will vote to award prizes for posters in three age groups.

"Spatial data and the GIS tools used to work with spatial data provide an exciting learning opportunity for students at all levels," explained Lyn Anderson, of the Delaware Office of Labor Market Information and leader of the Delaware Geographic Data Committee's Education Working Group. "Teachers are taking advantage of GIS to enhance geography, science, social studies and many other classes. The Delaware Geographic Data Committee hopes to honor all teachers by focusing each year in the work of one outstanding teacher. We hope to honor students through our poster contest."

Details on the award program, and the poster contest, have been sent to Delaware's school principals and to teachers throughout the state. Nominations for the award can come from supervisors, colleagues, students or students' families and are due by March 3, 2003. Details and nomination forms are available at *www.state.de.us/planning/gis2003/educationaward.html*.

The poster contest is open to any Delaware students in grades K-through-12. Posters are due by April 18, 2003. Details on the poster contest are available at *www.state.de.us/planning/gis2003 / k12postercontest.html*

The 2003 Delaware GIS Conference is built around the theme "A Vision for Tomorrow." It will present information on how Delaware's leaders use spatial data to create Delaware's future. It will also present a vision for a Delaware GIS Community that shares a seamless, statewide, public treasury of the spatial data needed to create that future. The role of GIS in Delaware's schools is an important part of that picture. More information on the 2003 Delaware GIS Conference is available at *www.state.de.us/planning/gis2003*.

# # #

Hey! We Need Your Help!!!

(We thought that might get your attention.)

Wanted: Teacher to Honor

We are the Delaware Geographic Data Committee. We need your help to find the Delaware teacher who is best at using digital maps and computers to teach geography, social studies, science, or other classes.

We need nominations for the **Second Annual Delaware GIS in Education Award,** to be given out at the **2003 Delaware GIS Conference**, April 29, at the University of Delaware.

So. Who is your favorite "Map Teacher?" Nomination forms and more details are on our web site, listed below.

Wanted: Posters!!!

(For a contest, not the Post Office)

We want to know: "What does Geography Mean to You?"

The Delaware Geographic Data Committee is sponsoring a student poster contest based on that theme. The posters will be displayed at the **2003 Delaware GIS Conference**, April 29, 2003, at the University of Delaware, in Newark. After the Conference, Prizes will be awarded in three age groups.

So. What **does** geography mean to your students? We'd like to know. More information on this exciting contest is on our web site, listed below.

www.state.de.us/planning/gis2003

2002 Framework Report

Where We Are At This Point...

DGDC/SMAC Meeting
February 6, 2003

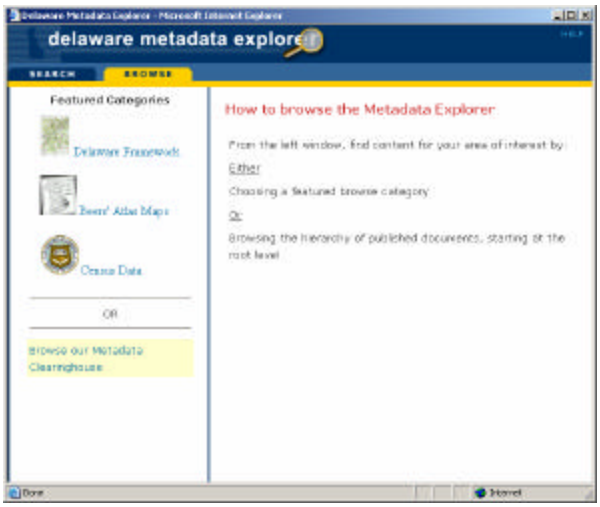
Overview

- Framework complete since 2000 at, at least, 1:24,000
- Last Year
  - DataMIL and Clearinghouse Improvements
  - Major enhancements in Cadastral data
- This Year
  - New OrthoImagery
  - Leveraging Some Enhancements?
  - Enabling truly distributed data-sharing

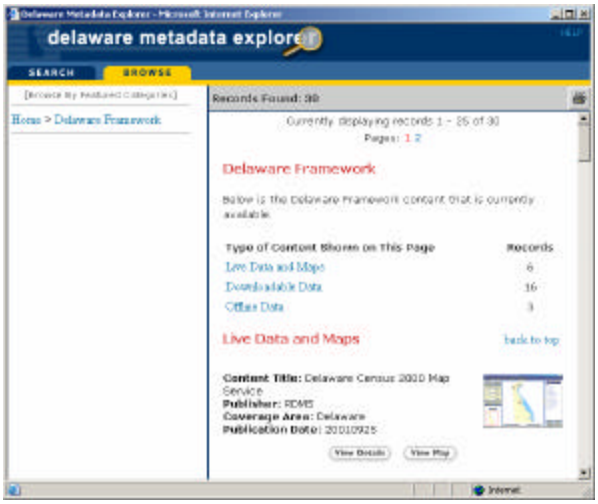
Access to Resources

- Delaware Metadata Explorer
- Delaware Data Mapping and Integration Laboratory (DataMIL)
  - Browsing, clipping, downloading
  - Direct IMS Access
- Other On-Line GIS

Delaware Metadata Explorer



Delaware Metadata Explorer

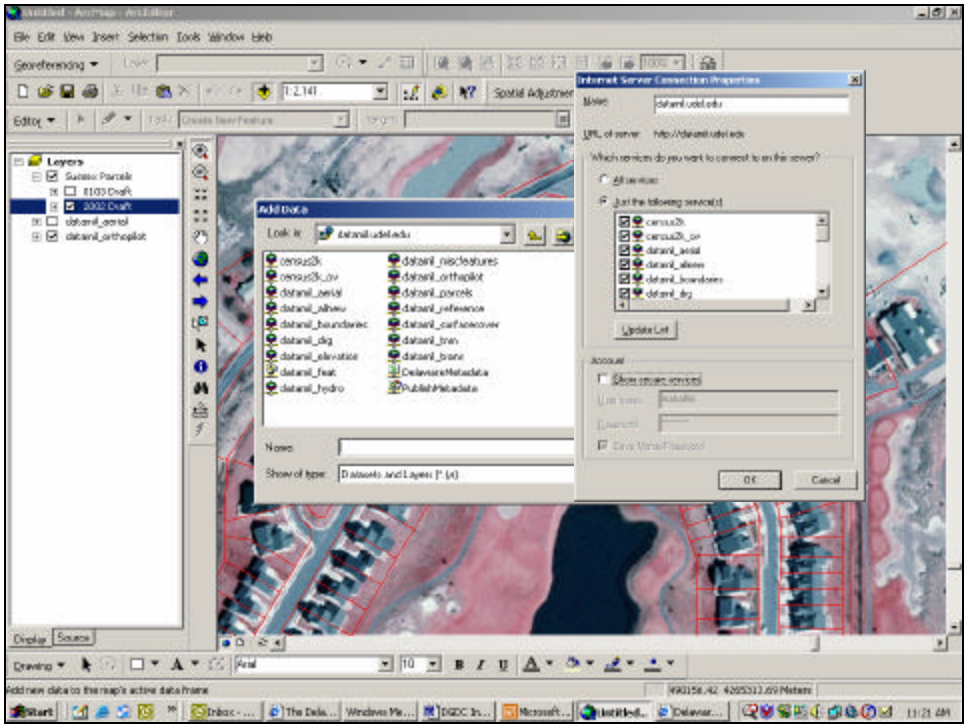


Who Has Published?

- Delaware Geological Survey
- Department of Elections
- Department of Natural Resources and Environmental Control
- Department of Transportation
- Federal Emergency Management Agency
- Fish and Wildlife Service
- New Castle County
- Office of State Planning Coordination
- Research & Data Management Services
- Spatial Analysis Lab
- State Historical Preservation Office
- United States Census Bureau
- United States Geological Survey
- WILMAPCO
- Water Resources Agency

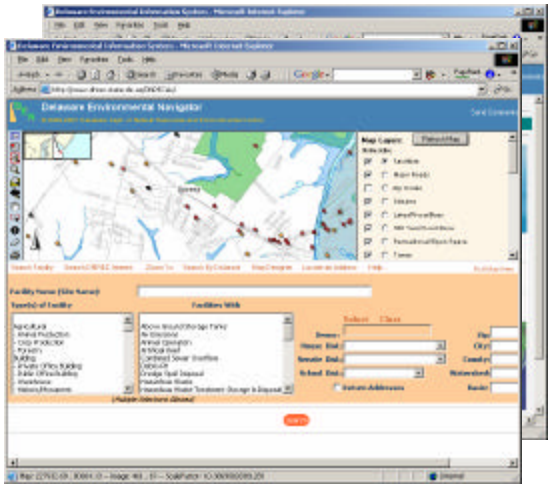
The DataMIL


Delaware DataMIL
USGS National Map Pilot
Map Production Laboratory
Locator Map
Legend
Layers
Getting Started
Quick Zoom
Zoom to Scale
Full State
Create A Map
Download Image
Legend
Locator Map
Size
Extract Data
Send Image to Forums
Refresh Map
Clear Map
Boundaries
County Parcels
Water Features
Transportation
Elevation


Add Data
Internet Server Connection Properties
Layers
Display
Source

Other On-Line GIS

- DNREC Env. Navigator



Other On-Line GIS

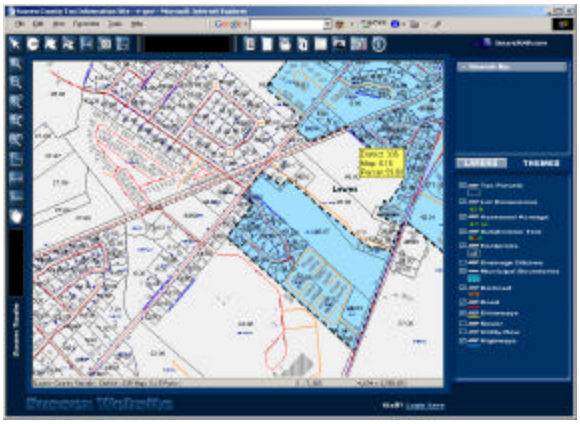
- DNREC Env. Navigator
- New Castle Co.

Other On-Line GIS

- DNREC Env. Navigator
- New Castle Co.
- Kent Co.

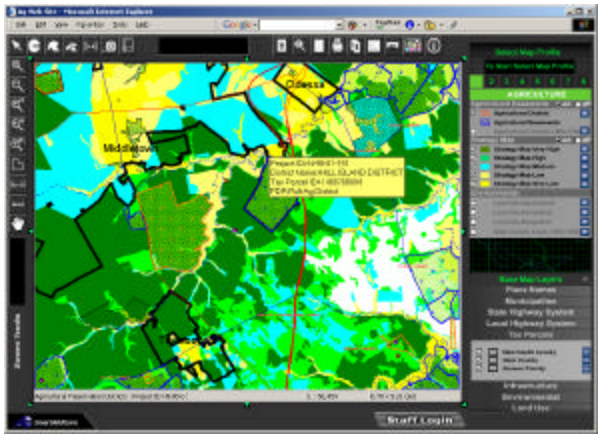
Other On-Line GIS

- DNREC Env. Navigator
- New Castle Co.
- Kent Co.
- Sussex Co.



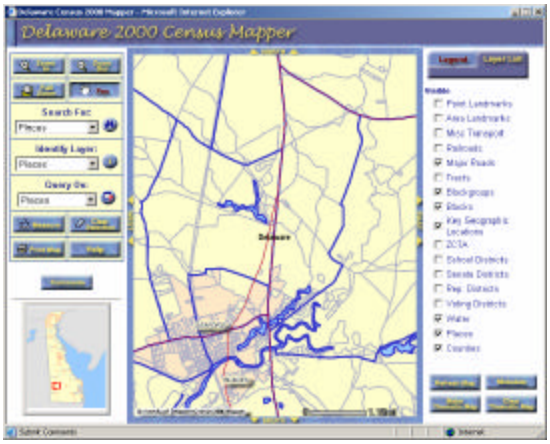
Other On-Line GIS

- DNREC Env. Navigator
- New Castle Co.
- Kent Co.
- Sussex Co.
- Dept. of Ag



Other On-Line GIS

- DNREC Env. Navigator
- New Castle Co.
- Kent Co.
- Sussex Co.
- Dept. of Ag.
- Census Mapper



Resources to Access

- OrthoImagery
- Geodetic Control
- Cadastre/Parcels
- Land Use/Land Cover
- Geographic Names
- Boundaries
- Elevation
- Water
- Transportation

OrthoImagery (Existing)

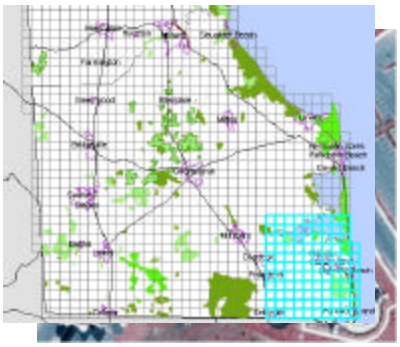
- Dated 1997
- 1-meter pixels, at 1:12,000
- Black and White
- Distribution
  - Spatial Analysis Lab (simplified)
  - DataMIL
  - Environmental Navigator
  - SmartMap Sites
  - On-Demand
- Metadata Published

OrthoImagery (New)

- I-Team Project (OSPC Staff Lead)
- Funding
  - DelDOT
  - DNREC
  - New Castle County
  - OSPC
- Photography in March and April 2002

OrthoImagery (New)

- 1-foot pixels, at 1:2,400
- False-Color Infrared
- Available starting now
  - 107 of 1,967 ortho tiles delivered
  - Metadata delivered
- Distribution?
  - DataMIL
  - Environmental Navigator
  - SmartMap Sites
  - On-demand
  - Other??



OrthoImagery, Future

- Next Round?
  - 2005?
  - Funding?
- Move to Digital Camera?
- Track Satellite Technology

Geodetic Control

- National Geodetic Survey HARN Network
- Maintained by the National Geodetic Survey
- Local Contact: Delaware Geological Survey
- Metadata Published

Geodetic Control, Future

- Keep in Framework?
- Tie-in with “less accurate” monumentation?
- Tie-in with survey community?

Cadastre/Parcels

- Complete and Maintained by Counties
- Varied Scales
- Most now match to 1:12,000 OrthImagery
  - “At least 1:12,00”?
- Metadata
  - New Castle Co. -- Published
  - Kent Co. -- To be Published
  - Sussex Co. -- To be Published

Cadastre/Parcels

- New Castle Co.
  - County ArcIMS
    - www.co.new-castle.de.us/GIS
    - www.co.new-castle.de.us/ParcelView/parcelsearch.asp
  - DataMIL
- Kent Co.
  - Smartmap (www.smartmap.com/kent_co)
  - To be added to DataMIL
- Sussex Co.
  - Smartmap (www.smartmap.com/sussex)
  - To be added to DataMIL

Cadastre/Parcels, Future

- Download sites?
- Statewide Standards
  - County Cadastral Group
  - Reviewing Possible Standards
- Integration with Transportation

Land Use/Land Cover

- Dated 1997 (Derived from OrthoImagery)
- 1:12,000
- Distribution
  - DataMIL
  - SmartMap Sites
  - Download from OSPC Web Site
- Metadata Published

Land Use/Land Cover (New)

- To be derived from 2002 OrthoImagery
- I-Team Project (OSPC Staff Lead)
- Funding
  - DelDOT
  - DNREC
  - New Castle County
  - OSPC
- 1:2,400

Land Use/Land Cover (New)

- Available by 6/30/03
- Local data used to check
- Distribution
  - DataMIL
  - SmartMap Sites (?)
  - Download from OSPC Web Site
- Metadata to be Published

Land Use/Land Cover, Future

- Closer tie to cadastre/parcel data?
- To allow more “real-time” updates?

Geographic Names

- Geographic Names Information System (GNIS)
- Maintained by USGS
- Distribution
  - DataMIL
  - USGS
- Metadata Published

Geographic Names, Future

- Move from “label-point” GNIS approach to attributes for specific features
- Many issues with USGS legacy approach
- Many names missing
  - New sub-divisions?
- What is the real future for GNIS?

State/County Boundaries

- USGS Delaware State and County Boundary Lines
- From Digital Line Graph (DLG)
- 1:24,000
- Stitched together from 57 quad sheets (Thanks Shannon Bain!)
- Distribution
  - DataMIL
  - USGS FTP
- Metadata Published

State/County Boundaries, Future

- Boundary vs. Shoreline
- County Boundaries
  - Relate to Cadastre?
- Boundary Monuments
  - Incorporate
  - Lock to

Municipal Boundaries

- Published by OSPC
- Generally 1:12,000, often larger scale
- Distribution
  - DataMIL
  - Download from OSPC Web Site
- Metadata Published

Municipal Boundaries, Future

- Continued Coordination with County Cadastre
- Updates via Municipal County Comprehensive Planning Process
- Establish stand-alone Municipal Boundaries Map Service?

Other Boundaries

- Census Geography
  - On DataMIL, Census Mapper
  - Realignment?
- Senate and Representative Districts
  - Published by Elections Commissioner
  - Based on Census
    - Will need update?

Elevation

- USGS “Topo Map” (DLG) Contour Lines
- 1:24,000
- Stitched together from 57 quad sheets (Thanks Shannon!)
- Distribution
  - DataMIL
  - USGS FTP
- Metadata Published

Elevation, Future

- LIDAR to develop “tighter” contours
  - Multi-agency project
  - As funding available
  - Led by Delaware Coastal Programs
- Digital Elevation Models?

Water

- USGS “Topo Map” (DLG) “Blue Lines”
- 1:24,000
- Stitched together from 57 quad sheets (Thanks Shannon Bain!)
- Distribution
  - DataMIL
  - USGS FTP
- Metadata Published

Water, Future

- Transfer to National Hydrography Dataset (NHD)
- Complete NHD for Delaware
  - Parts complete
  - Parts under way
  - Funding for the rest?

Watersheds

- DNREC Watersheds (1998)
- 1:12,000
- Distribution
  - DataMIL
  - Environmental Navigator
  - On-demand
- Metadata Published

Watersheds, Future

- Proposed Update
- Developed by USDA/NRCS and USGS
- Under review by DNREC now

Roads

- DelDOT Centerline Files
- 1:12,000
- Distribution
  - DataMIL
  - DelDOT
- Metadata Published

Roads, Future

- County Cadastre/DelDOT partnership
  - Counties maintain geometry and basic attributes
  - DelDOT maintains detailed attributes and aggregates for statewide coverage
- Specification under development
- Some Issues:
  - Center of ROW vs. Center of Roadway
  - Features from USGS Topo maps?

Railroads

- DelDOT Centerline Files
- 1:12,000
- Distribution
  - DataMIL
  - DelDOT
- Metadata Published

Railroads, Future

- Transfer to County Cadastre/DelDOT partnership?
- Maintenance?

Spatial and Temporal Data Acquisition From Historical Images

"Mapping 1937 Statewide Forest Cover"

by
Dave Carter, Rico Santiago,
Lonnie Dye,Tricia Cosby, Tim Lucas,
and
Heather Hudson

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

Motiva Enterprises Site
Delaware City, Delaware

1937

1992

Introduction

- Older growth forests in Delaware are among the most biologically diverse habitat community types in the State.
- The distribution of these habitats is not precisely known to effectively guide habitat protection efforts.
- A better understanding of the location, quantity, degree of fragmentation, and opportunities for restoration would greatly enhance the conservation of these habitats in Delaware.

1937 Aerial Photography

- Obtained from National Archives.
- Provides state-wide imagery of 1937 for interpretation of historic forest cover.
- Extracted data used for analytical and comparative assessments (i.e., comparison between 1937 and 1997 forest coverage and distribution).
- Coverage can be used to quantify changes in older forest with each new land use/land cover mapping effort in Delaware to track the distribution of these rare habitat areas.

Data Extraction Process

- Digitization
  - Hard copy photographs scanned
  - Scanned images saved and stored in high resolution TIFF format

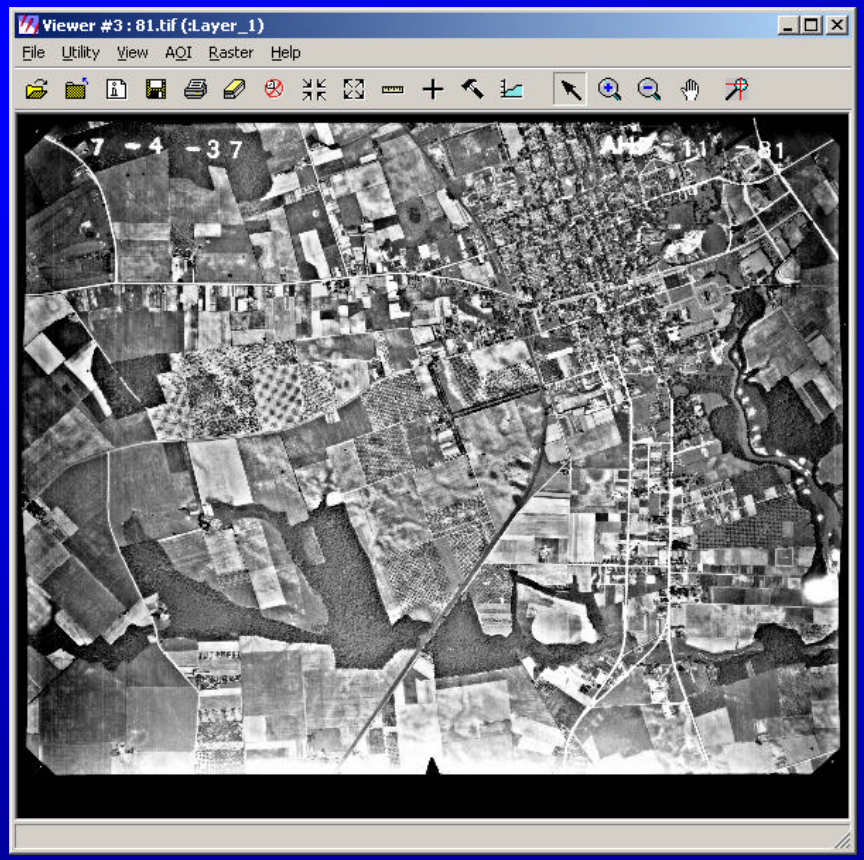
Dover, DE (ca. 1937)

DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

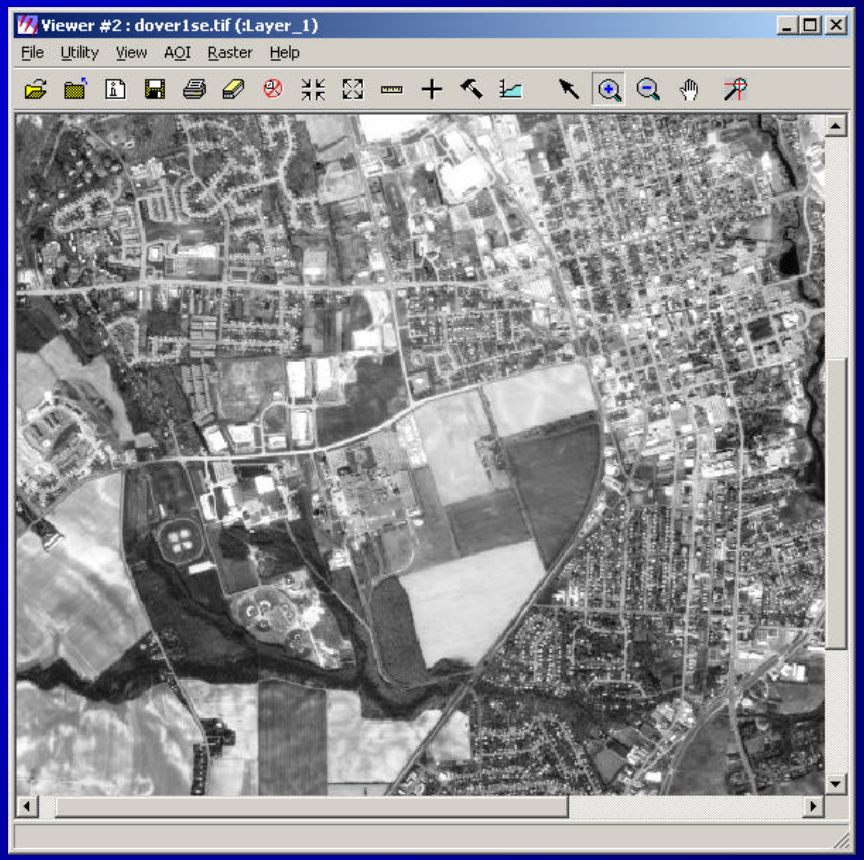
Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

Data Extraction Process (cont.)

- Georeferencing
  - Scanned images must be spatially referenced and projected to enable comparative analysis.
  - 1937 images registered to 1997 statewide DOQQ.
  - Registered 1937 images are subset to remove photograph borders, fiducial marks, and distorted edges.
  - Tool used: ERDAS Imagine, MrSID.



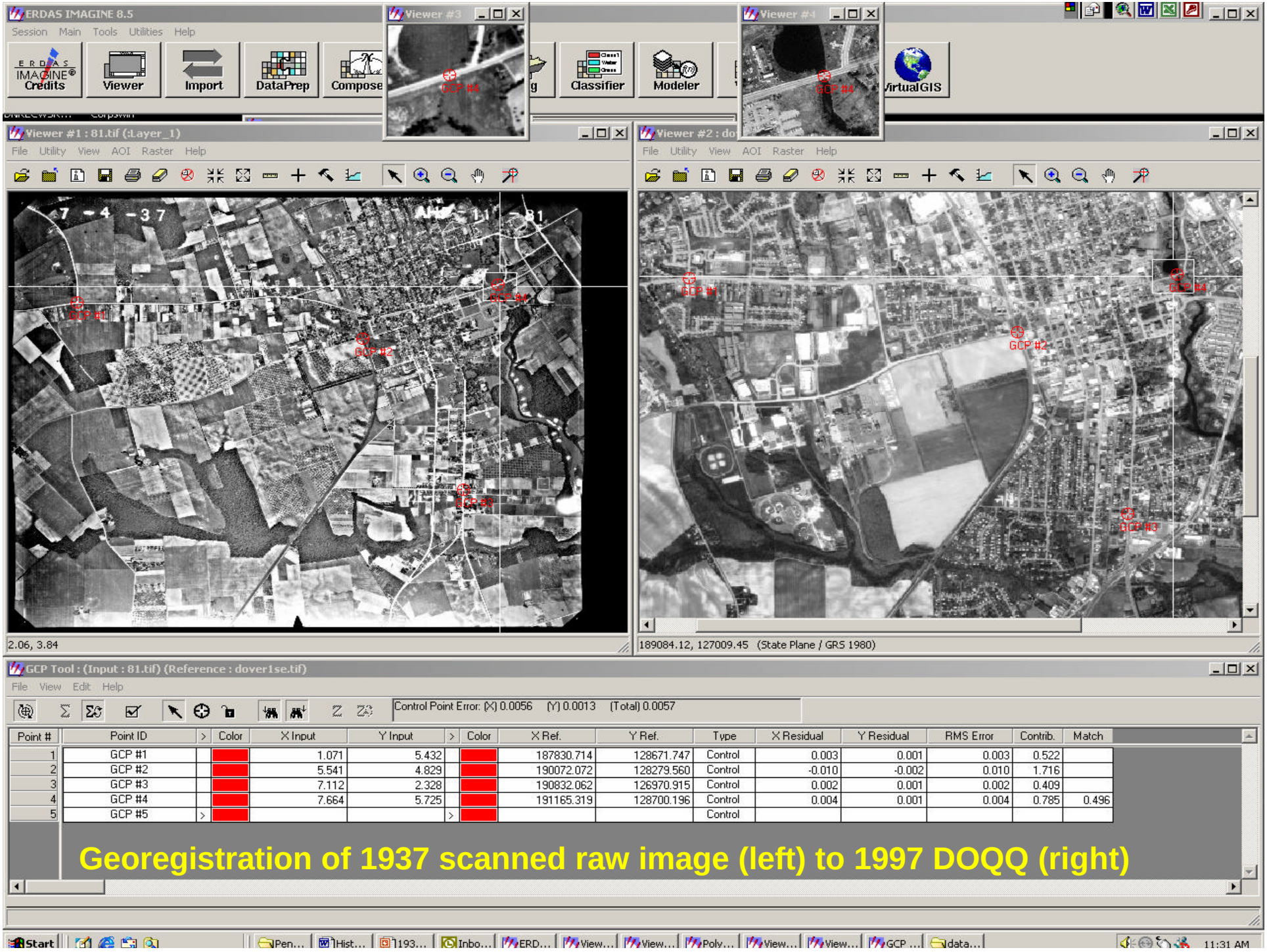
1937 Raw Image

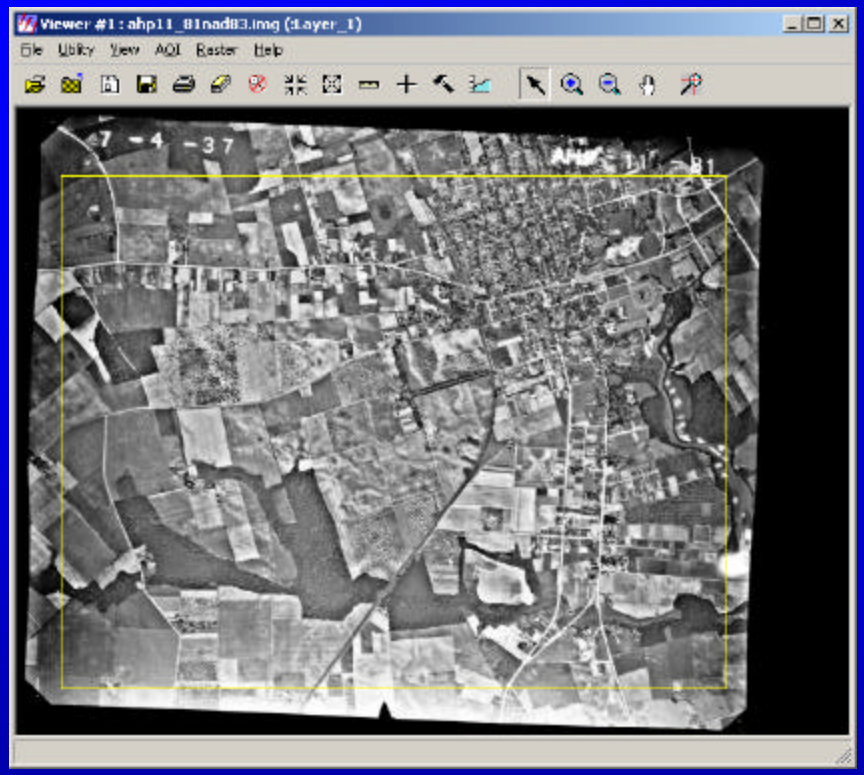


1997 DOQQ

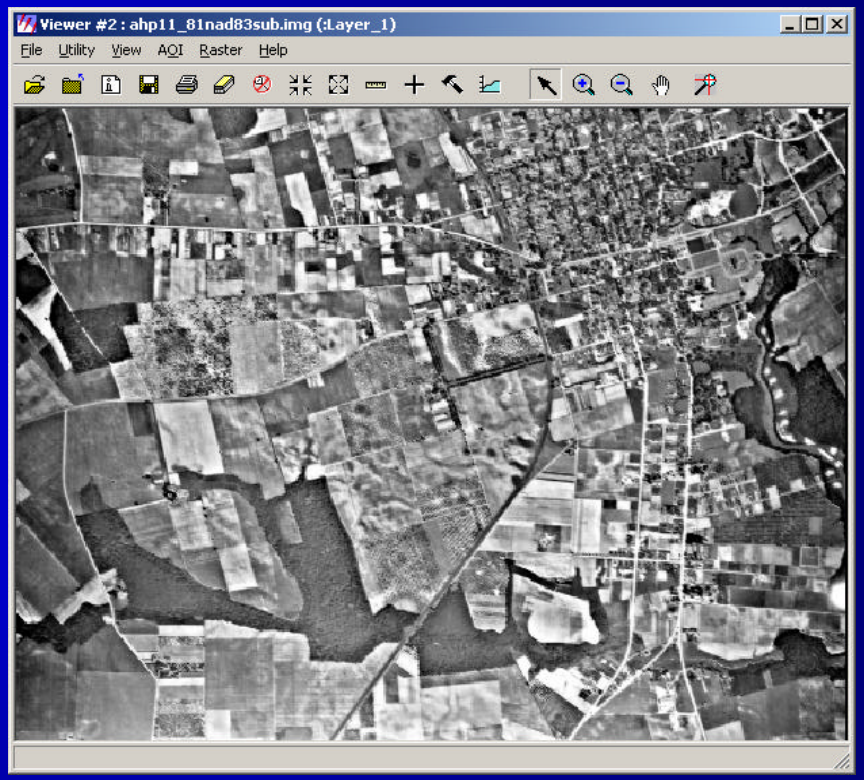
DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control


ERDAS IMAGINE 8.5
Session Main Tools Utilities Help
IMAGINE® Credits
Viewer
Import
DataPrep
Compose
Classifier
Modeler
VirtualGIS
Viewer #3
Viewer #4
Viewer #1 : 81.tif (:Layer_1)
File Utility View AOI Raster Help
GCP #1
GCP #2
GCP #3
GCP #4
2.06, 3.84
Viewer #2 : do
189084.12, 127009.45 (State Plane / GRS 1980)
GCP Tool : (Input : 81.tif) (Reference : dover1se.tif)
File View Edit Help
Control Point Error: (X) 0.0056 (Y) 0.0013 (Total) 0.0057
Point # | Point ID | Color | X Input | Y Input | Color | X Ref. | Y Ref. | Type | X Residual | Y Residual | RMS Error | Contrib. | Match
1 | GCP #1 | | 1.071 | 5.432 | | 187830.714 | 128671.747 | Control | 0.003 | 0.001 | 0.003 | 0.522 |
2 | GCP #2 | | 5.541 | 4.829 | | 190072.072 | 128279.560 | Control | -0.010 | -0.002 | 0.010 | 1.716 |
3 | GCP #3 | | 7.112 | 2.328 | | 190832.062 | 126970.915 | Control | 0.002 | 0.001 | 0.002 | 0.409 |
4 | GCP #4 | | 7.664 | 5.725 | | 191165.319 | 128700.196 | Control | 0.004 | 0.001 | 0.004 | 0.785 | 0.496
5 | GCP #5 | | | | | | | Control
Georegistration of 1937 scanned raw image (left) to 1997 DOQQ (right)
Start
11:31 AM



Registered image with yellow subset box



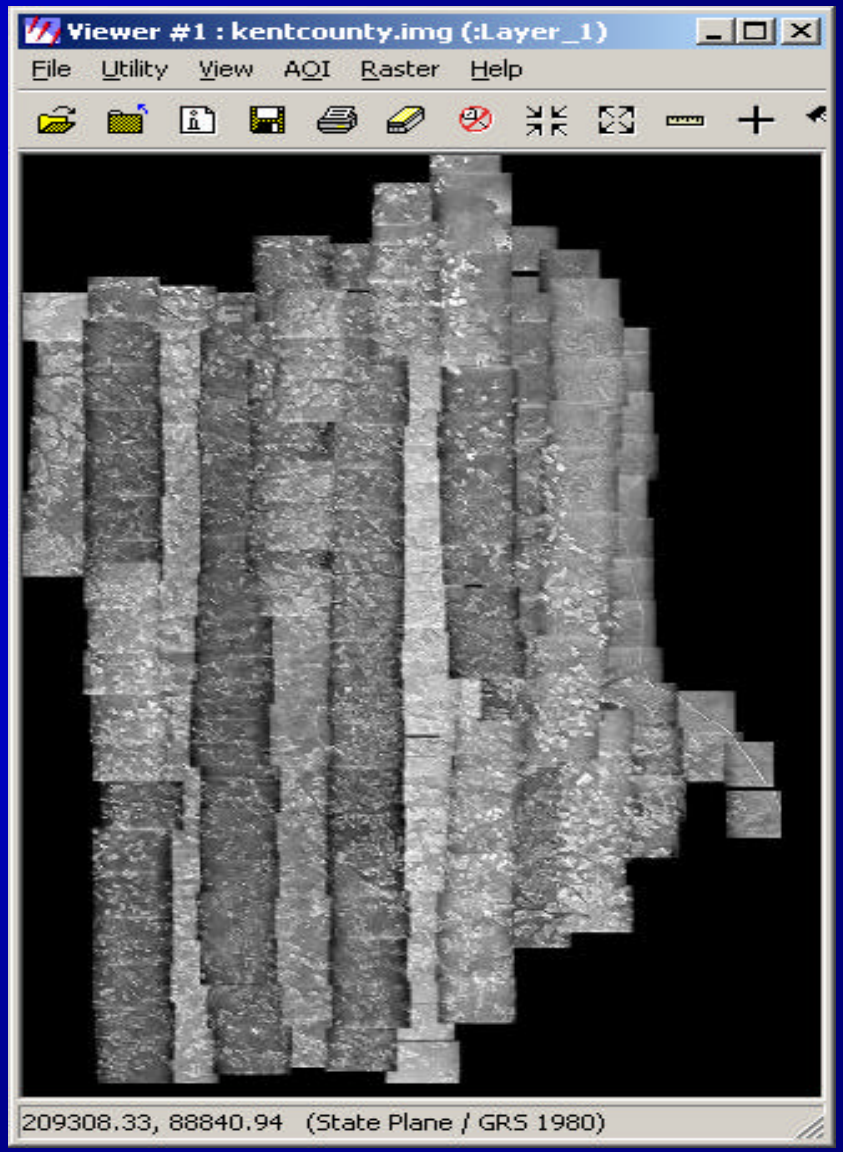
Subset of registered image

DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

Data Extraction Process (cont.)

- Image subsets grouped by county and mosaic-ed
- Progress of 1937 mosaics
  - 100% New Castle Co.
  - 100% Kent Co.
  - 25% Sussex Co.



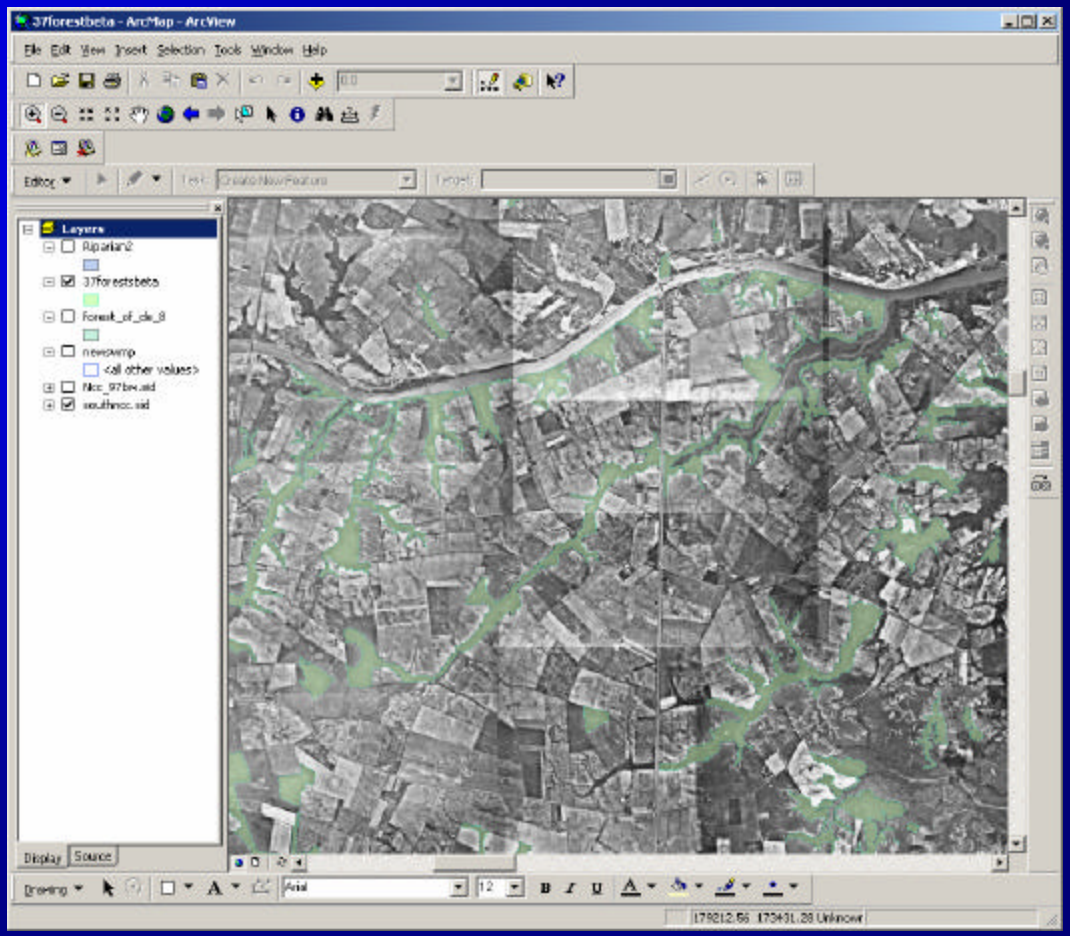
Kent County 1937

DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

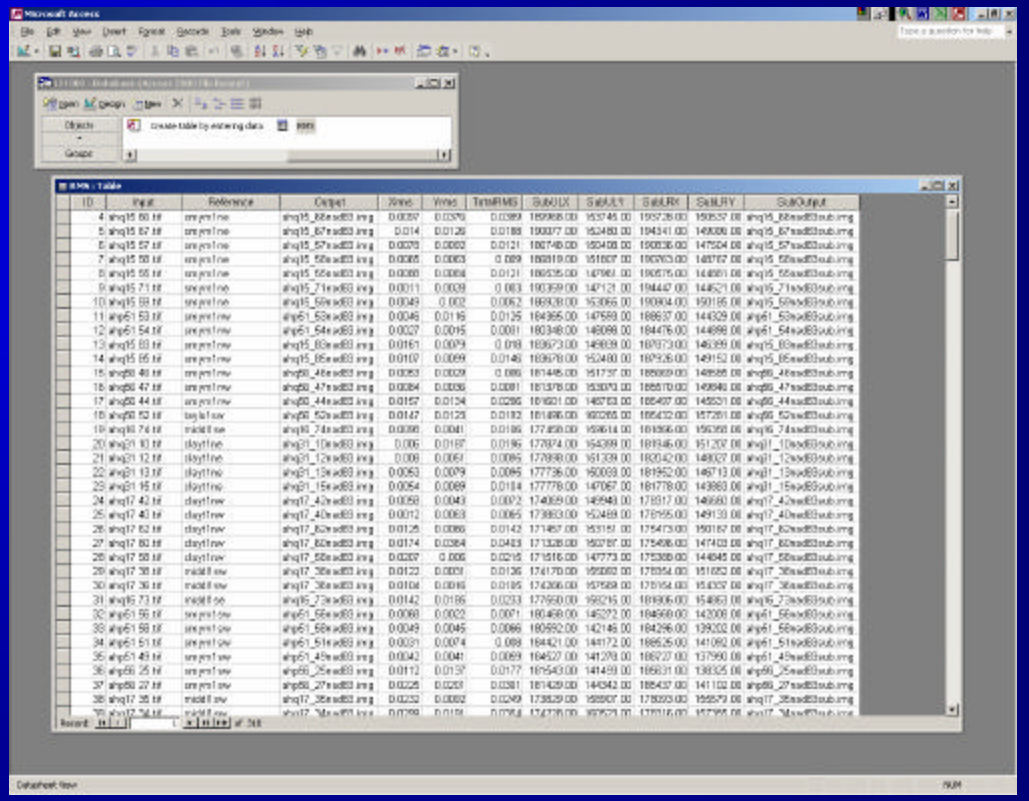
Data Extraction Process (cont.)

- Forest cover delineation
  - Analyst qualitatively determines land cover types and selects forest cover
  - Using ArcGIS software package, forest borders are traced and converted into polygons at standard 1:3000 scale.
  - Progress of 1937 forest cover delineation:
    - 100% New Castle Co.
    - 30% Kent Co.
    - 0% Sussex Co.



Data Extraction Process (cont.)

- QA/QC and Metadata
  - Georegistration made duplicable
    - Reference images catalogued
    - Registration points used for each raw image saved
    - RMS errors for each registered image saved
  - Mosaics compressed in MrSID format
    - Compression attributes saved



DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

Project Cost

Training	$ 1,200
Image Acquisition	$ 12,301
Image Scanning	$ 2,000
Image Registration	$ 21,656
Forest Cover Interpretation	$ 13,500
Total Cost	**$ 50,657**

NEXT STEPS

- Identify and acquire gaps in photo coverage.
- Complete statewide 1937 forest coverage.
- Use extracted data for trend analysis.
- Identify other key uses for dataset.
- Freely distribute final product as public domain data with no use restrictions except to cite the Delaware Coastal Programs as data source.

DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

Delaware Coastal Programs
Division of Soil and Water Conservation
Department of Natural Resources and Environmental Control

Kent County Levy Court
Dept. of Public Works
Engineering Division

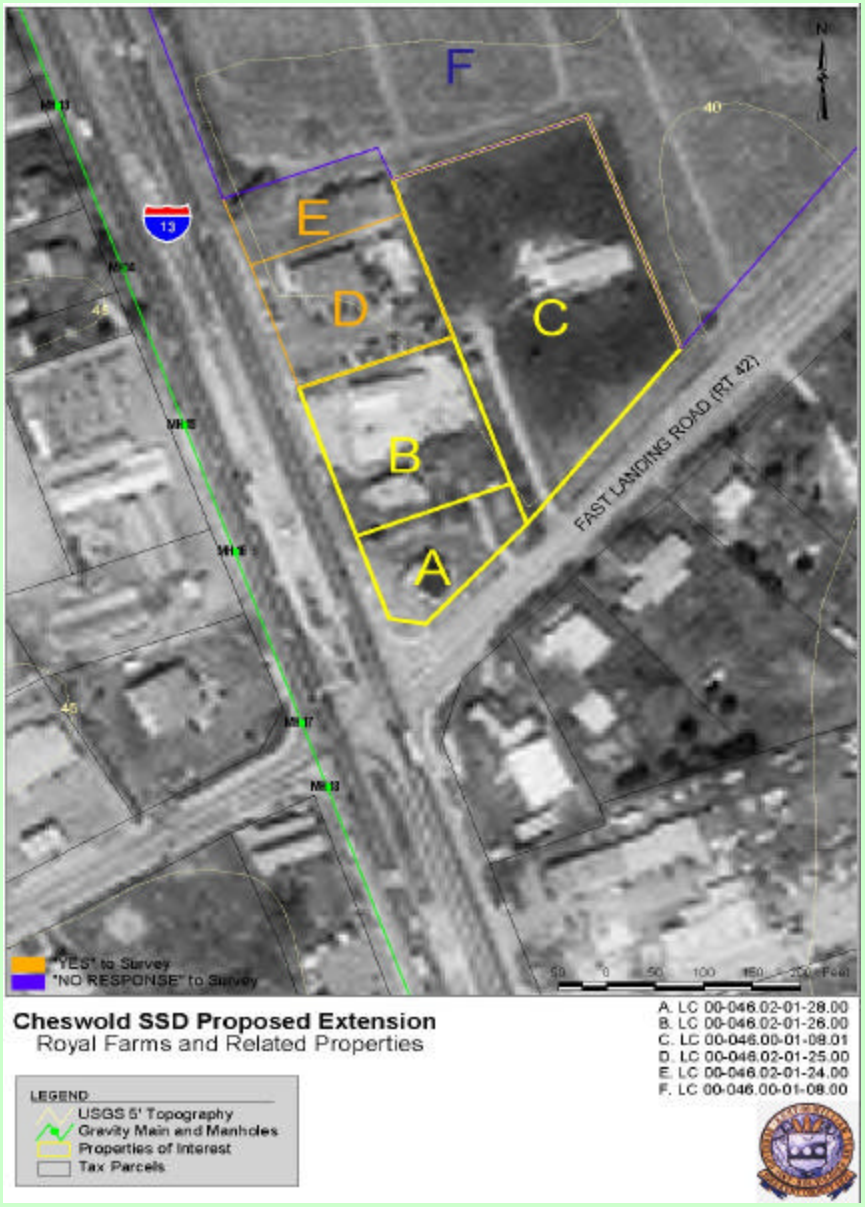
Sanitary Sewer Planning

Sanitary Sewer Planning …

- Sanitary Sewer District Extension
- Infrastructure Repair and Upgrade
- Comprehensive Planning

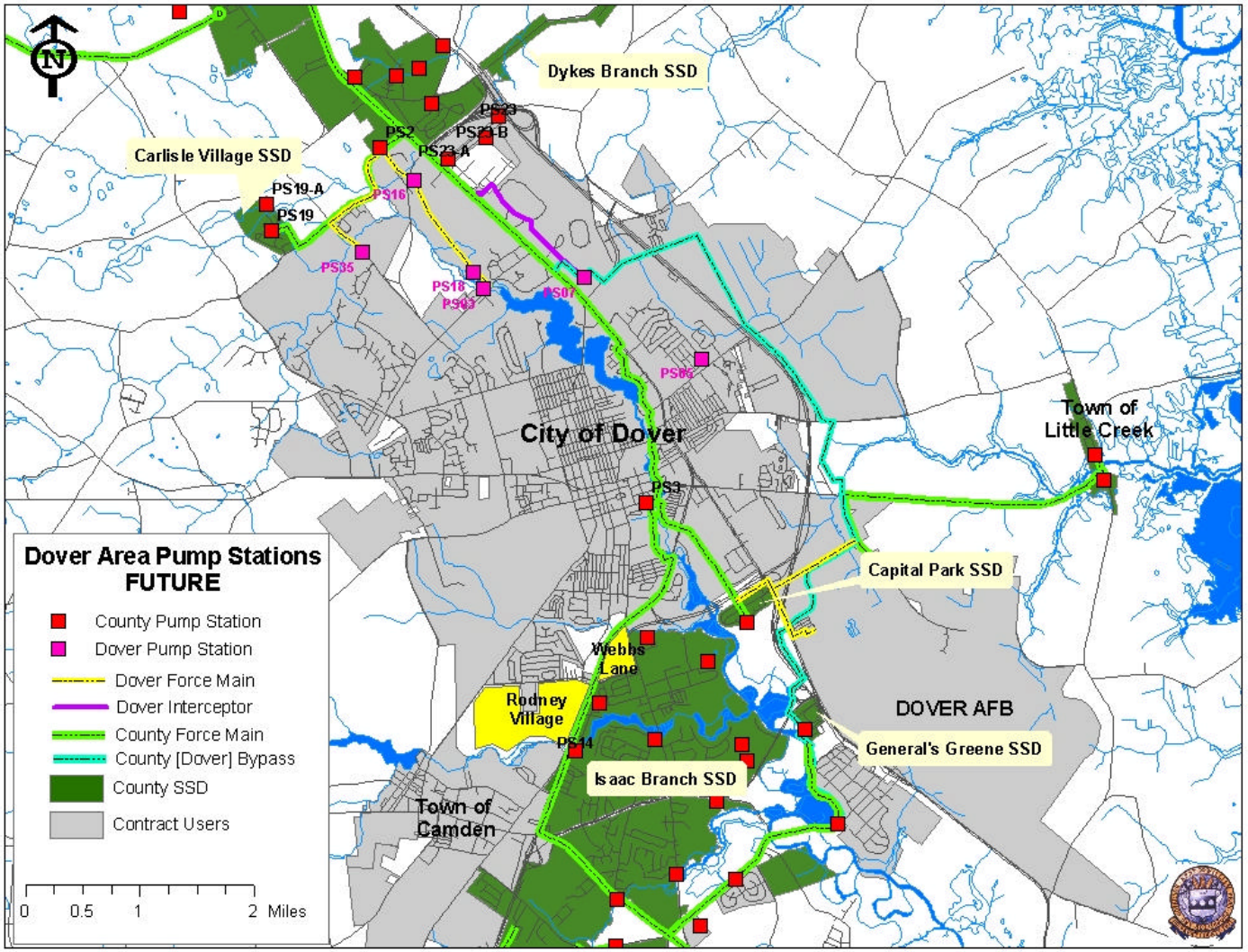
Sanitary Sewer Extensions

Expanding current sanitary sewer coverage



Infrastructure Upgrades …

Comprehensive Planning ...



Coming down the Pipe …

- Updated Sewer Districts
- Seamless / Integrated Sewer Map